

CLAIMS

1. A method for connecting a fitting to a conduit section using an insert affixed to the fitting, the insert defining two axially-spaced, raised detents, the method comprising the steps of:
 - positioning a one-piece collar over an external surface of the conduit section;
 - pressing the insert into a receiving end of the conduit section; and
 - pushing the one-piece collar along the external surface of the conduit section toward the receiving end of the conduit section to substantially align the one-piece collar between the two axially-spaced, raised detents.
2. The method of claim 1 wherein the step of pushing the one-piece collar along the external surface of the conduit section includes pushing the one-piece collar along the external surface until the one-piece collar straddles at least one of the two axially-spaced, raised detents.
3. The method of claim 1 wherein the one-piece collar defines a first end, a second end and an opening extending from the first end to the second end, the opening flaring from a position intermediate the first and second ends toward the first end; and the step of pushing the one-piece collar along the external surface of the conduit section includes pushing the one-piece collar toward the receiving end of the conduit section.
4. The method of claim 1 wherein the insert includes a generally cylindrical body; the two axially-spaced, raised detents are annular, raised detents; and the step of pushing the one-piece collar along the external surface of the conduit section includes pushing the one-piece collar along the external surface to substantially align the one-piece collar between the annular, raised detents.

5. The method of claim 1 wherein the insert includes a generally cylindrical body; the two axially-spaced, raised detents are annular barbs; and the step of pushing the one-piece collar along the external surface of the conduit section includes pushing the one-piece collar along the external surface to substantially align
5 the one-piece collar between the annular barbs.
6. The method of claim 1 including the additional step of mounting a seal on the insert between the two axially-spaced, raised detents prior to the step of pressing the insert into the receiving end of the conduit section.
7. The method of claim 1 wherein the insert includes a generally cylindrical body and an annular groove between the axially-spaced, raised detents; and the method includes the additional step of mounting an annular seal in the annular groove prior to the step of pressing the insert into the receiving end of the
5 conduit section.
8. The method of claim 1 wherein the insert defines a smaller, raised detent between the two axially-spaced, raised detents, the smaller, raised detent being smaller than the two axially-spaced, raised detents; and the step of pushing the one-piece collar along the external surface of the conduit section includes pushing
5 the one-piece collar along the external surface to substantially align the one-piece collar over the smaller, raised detent.
9. The method as recited in claim 1 wherein the insert includes a staple; the method includes the additional steps of threading a strap defining strap end portions through the staple and bending the strap near the staple; and the step of pushing the one-piece collar along the external surface of the conduit section
5 includes pushing the one-piece collar over one of the strap end portions.

10. A method for connecting a fitting to a conduit section using a rigid, one-piece collar, the one-piece collar defining a first end, a second end and an opening extending from the first end to the second end, the opening flaring from a position intermediate the first and second ends toward the first end, the method
- 5 comprising the steps of:
- positioning the one-piece collar over an external surface of the conduit section such that the first end of the one-piece collar faces a receiving end of the conduit section;
- pressing an insert affixed to the fitting into the receiving end of the
- 10 conduit section; and
- pushing the one-piece collar along the external surface of the conduit section toward the receiving end of the conduit section.
11. The method of claim 10 including the additional step of mounting a seal on the insert prior to the step of pressing the insert into the receiving end of the conduit section.
12. The method of claim 10 wherein the insert includes a generally cylindrical body and an annular groove; and the method includes the additional step of mounting an annular seal in the annular groove prior to the step of pressing the insert into the receiving end of the conduit section.
13. The method of claim 10 including the additional step of mounting a seal on the insert prior to the step of pressing the insert into the receiving end of the conduit section; and wherein the step of pushing the one-piece collar along the external surface of the conduit section includes pushing the one-piece collar along
- 5 the external surface to substantially align the one-piece collar over the seal.

14. The method as recited in claim 10 wherein the insert includes a staple; the method includes the additional steps of threading a strap defining strap end portions through the staple and bending the strap near the staple; and the step of pushing the one-piece collar along the external surface of the conduit section
- 5 includes pushing the one-piece collar over one of the strap end portions.
15. A method for connecting a fitting to a conduit section using an insert affixed to the fitting, the insert defining a first raised detent, a second raised detent axially spaced from the first raised detent and a third raised detent axially spaced from the second raised detent, the method comprising the steps of:
- 5 pressing the insert into a receiving end of the conduit section;
- placing the first retainer over an external surface of the conduit section in substantial alignment between the first and second raised detents; and
- placing the second retainer over the external surface of the conduit section in substantial alignment between the second and third raised detents.
16. The method of claim 15 wherein the step of placing the first retainer over the external surface of the conduit section includes placing the first retainer such that the first retainer straddles at least one of the first and second raised detents.
17. The method of claim 15 wherein the first retainer is a rigid, one-piece collar; and the step of placing the first retainer over the external surface of the conduit section includes:
- 5 positioning the first retainer over the external surface; and
- pushing the first retainer along the external surface toward the receiving end of the conduit section.

18. The method of claim 15 wherein the first retainer is a rigid, one-piece collar, the one-piece collar defining a first end, a second end and an opening extending from the first end to the second end, the opening flaring from a position intermediate the first and second ends toward the first end; and the step of placing
5 the first retainer over the external surface of the conduit section includes:
positioning the first retainer over the external surface such that the first end of the first retainer faces the receiving end of the conduit section; and
pushing the first retainer along the external surface toward the receiving end of the conduit section.
19. The method of claim 15 wherein the first retainer is a clamp; and the step of placing the first retainer over the external surface of the conduit section includes:
5 positioning the first retainer over the external surface in substantial alignment between the first and second raised detents; and
tightening the first retainer over the external surface.
20. The method of claim 15 wherein the insert includes a generally cylindrical body; the first and second raised detents are annular, raised detents; and
10 the step of placing the first retainer over the external surface of the conduit section includes placing the first retainer in substantial alignment between the annular, raised detents.
21. The method of claim 15 wherein the insert includes a generally cylindrical body; the first and second raised detents are annular barbs; and the step of placing the first retainer over the external surface of the conduit section includes placing the first retainer in substantial alignment between the annular barbs.
22. The method of claim 15 including the additional step of mounting a seal on the insert between the first and second raised detents prior to the step of pressing the insert into the receiving end of the conduit section.

23. The method of claim 15 wherein the insert includes a generally cylindrical body and an annular groove between the first and second raised detents; and the method includes the additional step of mounting an annular seal in the annular groove prior to the step of pressing the insert into the receiving end of the
5 conduit section.

24. The method of claim 15 including the additional step of mounting a seal on the insert between the first and second raised detents prior to the step of pressing the insert into the receiving end of the conduit section; and wherein the step of placing the first retainer over the external surface of the conduit section includes
5 placing the first retainer over the seal.

25. The method of claim 15 wherein the insert defines a fourth raised detent between the first and second raised detents, the fourth raised detent being smaller than the first and second raised detents; and the step of placing the first retainer over the external surface of the conduit section includes placing the first
5 retainer over the seal.

26. The method as recited in claim 15 wherein the insert includes a staple; the method includes the additional steps of threading a strap defining strap end portions through the staple and bending the strap near the staple; and the step of placing one of the first and second retainers over the external surface of the conduit section includes placing that one of the first and second retainers over one of the strap end portions.

27. A method for connecting a fitting to a conduit section using an insert affixed to the fitting, the insert defining two axially-spaced, raised detents and including a staple, the method comprising the steps of:
- 5 pressing the insert into a receiving end of the conduit section;
threading a strap defining strap end portions through the staple;
bending the strap near the staple; and
positioning a retainer over one of the strap end portions.
28. The method as recited in claim 1 including the additional step of positioning the one-piece collar over an external surface of the conduit section; and wherein the step of positioning the retainer over one of the strap end portions includes pushing the one-piece collar along the external surface of the conduit section toward the receiving end of the conduit section.
29. The method as recited in claim 1 wherein the retainer is a clamp and the method includes the additional step of tightening the retainer over the external surface.
30. Apparatus for connecting a fitting to a conduit section comprising:
a rigid insert defining a central lumen; and
a rigid, one piece collar having an opening sufficiently large to receive the insert, the one-piece collar defining a first end, a second end and an
5 opening extending from the first end to the second end, the opening flaring from a position intermediate the first and second ends toward the first end.
31. The apparatus of claim 30 wherein the insert includes a generally cylindrical body and an annular groove.
32. The apparatus of claim 30 wherein the insert includes a generally cylindrical body and an annular groove; and the apparatus includes an annular seal seated in the annular groove.

33. The apparatus of claim 30 wherein one end of the insert is chamfered.
34. The apparatus of claim 30 wherein the insert and the one-piece collar are composed of the same material.
35. The apparatus of claim 30 including a strap, wherein the insert includes a staple for receiving the strap.
36. A rigid insert for connecting a fitting to a conduit section, the rigid insert comprising a body defining a central lumen; a first raised detent; a second raised detent axially spaced from the first raised detent; and a third raised detent between the first and second raised detents, the third raised detent being smaller than
5 the first and second raised detents.
37. The rigid insert of claim 36 wherein the insert includes a generally cylindrical body; and the first, second and third raised detents are annular, raised detents.
38. The rigid insert of claim 36 wherein the insert includes a generally cylindrical body; and the first, second and third raised detents are annular barbs.
39. The rigid insert of claim 36 wherein the first and second raised detents are substantially the same in size and configuration.
40. The rigid insert of claim 36 including a fourth raised detent between the first and second raised detents, the third and fourth raised detents being substantially the same in size and configuration.

41. The rigid insert of claim 36 including a fourth raised detent and a fifth raised detent; the fifth raised detent being axially spaced from the first and second raised detents; the fourth raised detent being between the fifth raised detent and one of the first and second raised detents; and the fourth raised detent being smaller than
5 the first, second and fifth raised detents.

42. The rigid insert of claim 36 including a fourth raised detent and a fifth raised detent; the fifth raised detent being axially spaced from the first and second raised detents; the fourth raised detent being between the fifth raised detent and one of the first and second raised detents; the first, second and fifth raised detents being
5 substantially the same in size and configuration; and the fourth raised detent being smaller than the first, second and fifth raised detents.

43. The rigid insert of claim 36 including a fourth raised detent and a fifth raised detent; the fifth raised detent being axially spaced from the first and second raised detents; the fourth raised detent being between the fifth raised detent and one of the first and second raised detents; and the third and fourth raised detents being
5 substantially the same in size and configuration.

44. The rigid insert of claim 36 including a generally cylindrical body and an annular groove between the first and second raised detents.

45. The rigid insert of claim 46 in combination with an annular seal, wherein the insert includes a generally cylindrical body and an annular groove between the first and second raised detents; and the annular seal is seated in the annular groove.

46. The rigid insert of claim 36 wherein one end of the insert is chamfered.

47. The rigid insert of claim 36 in combination with a rigid, one-piece collar having an opening sufficiently large to receive the insert.

48. The rigid insert of claim 36 in combination with a rigid, one piece collar having an opening sufficiently large to receive the insert, the one-piece collar defining a first end, a second end and an opening extending from the first end to the second end, the opening flaring from a position intermediate the first and second ends toward the first end.
49. The rigid insert of claim 36 in combination with a rigid, one-piece collar having an opening sufficiently large to receive the insert. the insert and the one-piece collar being composed of the same material.
50. The rigid insert of claim 36 mounting a staple.
51. Apparatus comprising:
a conduit section defining a conduit section lumen;
a fitting;
a rigid insert defining a central lumen and two axially-spaced, raised detents, the rigid insert being affixed to the fitting and extending into the conduit section lumen; and
a rigid, one-piece collar positioned over the conduit section in substantial alignment between the two axially-spaced, raised detents.
52. The apparatus of claim 51 wherein the one-piece collar straddles at least one of the two axially-spaced, raised detents.
53. The apparatus of claim 51 wherein the insert includes a generally cylindrical body and the two axially-spaced, raised detents are annular, raised detents
54. The apparatus of claim 51 wherein the insert includes a generally cylindrical body and two axially-spaced, raised detents are annular barbs.
55. The apparatus of claim 51 wherein the two axially-spaced, raised detents are substantially the same in size and configuration.

56. The apparatus of claim 51 including a smaller raised detent between the two axially-spaced, raised detents, the smaller raised detent being smaller than the two axially-spaced, raised detents.

57. The apparatus of claim 51 including a third raised detent and a fourth raised detent; the third raised detent being axially spaced from the two axially-spaced, raised detents; the fourth raised detent being between the third raised detent and one of the two axially-spaced, raised detents; and the fourth raised detent being
5 smaller than the two axially-spaced, raised detents and the third raised detent.

58. The apparatus of claim 51 including a third raised detent and a fourth raised detent; the third raised detent being axially spaced from the two axially-spaced, raised detents; the fourth raised detent being between the third raised detent and one of the two axially-spaced, raised detents; the two axially-spaced, raised
5 detents and the third raised detent being substantially the same in size and configuration; and the fourth raised detent being smaller than the two axially-spaced, raised detents and the third raised detent.

59. The apparatus of claim 51 including an seal mounted on the insert between the two axially-spaced, raised detents.

60. The apparatus of claim 51 including an annular seal, wherein the insert including a generally cylindrical body and an annular groove between the two axially-spaced, raised detents; and the annular seal is seated in the annular groove.

61. The apparatus of claim 51 wherein the one-piece collar defines a first end, a second end and an opening extending from the first end to the second end; the opening flares from a position intermediate the first and second ends toward the first end; and the first end faces the fitting.

62. The apparatus of claim 51 wherein the insert and the one-piece collar are composed of the same material.

63. The apparatus of claim 51 including a strap defining strap end portions, wherein the insert includes a staple; the strap passes through the staple; and one of the strap end portions engages the one-piece collar.
64. Apparatus comprising:
a conduit section defining a conduit section lumen;
a fitting;
a rigid insert defining a central lumen, the rigid insert being affixed to
5 the fitting and extending into the conduit section lumen; and
a rigid, one-piece collar positioned over the conduit section, the one-piece collar defining a first end, a second end and an opening extending from the first end to the second end; the opening flares from a position intermediate the first and second ends toward the first end; and the first end faces the fitting.
65. The apparatus of claim 64 including an seal mounted on the insert.
66. The apparatus of claim 64 including an annular seal, wherein the insert including a generally cylindrical body and an annular groove between the two axially-spaced, raised detents; and the annular seal is seated in the annular groove.
67. The apparatus of claim 64 including an seal mounted on the insert, the one-piece collar being in substantial alignment over the seal.
68. The apparatus of claim 64 including a strap defining strap end portions, wherein the insert includes a staple; the strap passes through the staple; and one of the strap end portions engages the one-piece collar.

69. Apparatus comprising:
a conduit section of pipe defining a conduit section lumen;
a fitting;
a rigid insert defining a central lumen, a first raised detent, a second
5 raised detent axially spaced from the first raised detent and a third raised detent
axially spaced from the first and second raised detents, the rigid insert being affixed
to the fitting and extending into the conduit section lumen;
a first retainer positioned over the conduit section in substantial
alignment between the first and second raised detents; and
10 a second retainer positioned over the conduit section in substantial
alignment between the second and third raised detents.
70. The apparatus of claim 69 wherein the first retainer straddles at least
one of the first and second raised detents.
71. The apparatus of claim 69 wherein the first retainer is a rigid, one-
piece collar.
72. The apparatus of claim 69 wherein the first retainer is a rigid, one-
piece collar, the one-piece collar defining a first end, a second end and an opening
extending from the first end to the second end, the opening flaring from a position
intermediate the first and second ends toward the first end; and the first end of the
5 first retainer faces the fitting.
73. The apparatus of claim 69 wherein the first retainer is a clamp.
74. The apparatus of claim 69 wherein the insert includes a generally
cylindrical body; and the first and second raised detents are annular, raised detents.

75. The apparatus of claim 69 wherein the insert includes a generally cylindrical body; and the first and second raised detents are annular barbs.

76. The apparatus of claim 69 including a seal mounted on the insert between the first and second raised detents.

77. The apparatus of claim 69 including an annular seal, wherein the insert includes a generally cylindrical body and an annular groove between the first and second raised detents; and the annular seal is seated in the annular groove.

78. The apparatus of claim 69 wherein the insert defines a fourth raised detent between the first and second raised detents, the fourth raised detent being smaller than the first and second raised detents.

79. The apparatus of claim 69 wherein the insert defines a fourth raised detent and a fifth raised detent, the fourth and fifth raised detents being between the first and second raised detents; and the fourth and fifth raised detents being smaller than the first and second raised detents.

80. The apparatus of claim 69 including a fourth raised detent and a fifth raised detent; the fourth raised detent being between the first and second raised detents; the fifth raised detent being between the second and third raised detents; the first, second and third raised detents being substantially the same in size and
5 configuration; and the fourth and fifth raised detents being smaller than the first, second and fifth raised detents.

81. The apparatus of claim 69 including a fourth raised detent and a fifth raised detent; the fourth raised detent being between the first and second raised detents; the fifth raised detent being between the second and third raised detents; and the third and fourth raised detents being smaller than the first, second and third
5 raised detents; and the fourth and fifth raised detents being substantially the same in size and configuration.

82. The apparatus of claim 69 including a strap defining strap end portions, wherein the insert includes a staple; the strap passes through the staple; and one of the strap end portions engages the one of the first and second retainers.

83. Apparatus comprising:

a conduit section defining a conduit section lumen;

a fitting;

a rigid insert defining a central lumen, the rigid insert being affixed to

5 the fitting and extending into the conduit section lumen;

The rigid insert including a staple;

a retainer positioned over the conduit section in substantial alignment between the first and second raised detents; and

a strap defining strap end portions, the strap passing through the

10 staple and one of the strap end positions engaging the retainer.